Special 8-Page Issue On A Nuclear Test Ban

The Fight That May Decide Whether There Will Be A World War III

If—and it is still a big if—a nuclear test ban treaty emerges from the Geneva talks, the Senate fight over its confirmation will be the most important this country and the world has seen since the Senate rejected Woodrow Wilson's League of Nations in 1919. Had Wilson won, that might have prevented the rise of Hitler and World War II. The stakes in the coming fight over a nuclear test ban treaty will be as momentous. The need for wide and informed support will be urgent. To help toward public understanding of the issues we are devoting this double-sized special number to coverage of two related events—the four days of hearings on test detection held last week by the Congressional Joint Committee on Atomic Energy and the full-dress speech made by Senator Hubert Humphrey in the Senate on the subject last Thursday. Both were poorly covered by the press.

I. F. Stone's Bi-Weekly

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Our American Mass Mania About Secret Nuclear Tests

When the history of our times comes to be written, the current furore over the possibility of secret nuclear tests underground or in outer space will be recognized for what it is —a form of mass delusion, like those which once set whole countries crazy with the fear of witches. It will take its place with other instances of human credulity and superstition. The word superstition may seem strong when we are dealing with the very latest advances in technology, but our national obsession with nuclear weapons belongs in the realm of ancient magic— the Bomb stirs in our still primitive unconscious the reverence the Canaanites once felt for their Moloch; it too is both God and Fiery Furnace. We regard science with the awe a tribesman accorded his witch doctor—who knows what will be the next miracle of destructiveness to emerge from this mumbo-jumbo of mathematical formulas? We live in fear that some other tribe may outdo our magic, may some dark night work up a more devilish device than ours, may *test* it when we're not looking.

Operation Self-Destruction

For four days last week I sat in on the hearings held by the Joint Congressional Committee on Atomic Energy on the problem of detecting secret nuclear tests, and I watched on Thursday when Hubert Humphrey of Minnesota took the floor before an almost empty Senate and an indifferent press gallery to challenge the enemies of a test ban agreement. I felt as if I were listening in on an Operation Self-Destruction, the marshalling of fear and mistrust to block a first agreement that might move mankind slowly back toward safety. The Joint Committee has degenerated into a tool of the AEC and of the worst elements in the Pentagon, particularly the Air Force. One-time and part-time Democratic liberals on the Committee like Senator Anderson of New Mexico and Congressman Chet Holifield of California have joined up in a coalition with the rightists to undercut the Kennedy Administration's moves toward a nuclear test ban.

The atmosphere of the controversy is one in which the most distant and fantastic possibilities for hiding tests, underground or in outer space, are listened to eagerly. The proponents of a test ban are expected to dispose of these possibilities by proving negative propositions. You remember when the Russians photographed the other side of the moon? What if some Senator suggests they have already dropped a small expedition on the back side of the moon, and are testing weapons on it? How would one go about disproving this? One could disclose our intelligence capacity for monitoring Soviet space activity, and argue it was most unlikely that the Russians could have dispatched an expedition to the moon without our knowing about it. *But one could not prove it did not happen.* What if the Kennedy Administration hid the news of a moon expedition to save itself from public criticism for not getting there first? What if the Russians

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AEC Admits The Limitations Of Tests Underground

"The underground testing program has proved quite successful. In some experiments, tests underground have proven to have a distinct technical advantage in containing rather than releasing radioactivity to the atmosphere. It must be recognized, however, that this method of testing is an expensive process even though operational efficiencies have increased with our experience; also certain type tests such as effects tests and many high yield detonations can only be carried out in the atmosphere and in the environment to which they pertain and at their particular design yield."

—Jan. 1963: Annual Report of AEC for '62, p.233.

Read this closely. The only evidence to support the claim of success is that "in some experiments" underground, the radioactivity has been contained. This indicates that in others it was not contained. On the other hand, these tests are "expensive", i.e. even by the AEC's opulent standards. Finally, you cannot tell what "effects" a weapon will have unless you test it above ground; you cannot test large detonations underground and you cannot extrapolate from small to large but must test weapons "at their particular design yield." Why are such striking admissions left buried on p. 233 of a report few will ever read?

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have a new device to render themselves invisible on their way to the moon? This is the type of question, surmise and supposition that one encounters in trying to demonstrate what every informed scientist admits—that the kind of cheating the Russians might do in far outer space would be too fantastically costly to be worth it, that cheating underground would be of only marginal value, and that the chances of getting caught in either case would be substantial enough to make a violator pause before risking it.

A "Lead Balloon" in Outer Space

The opponents of a test ban are always coming up with ingenious gimmicks which make headlines and create mistrust. When sober scientists rebut them, the rebuttal is waved aside or ignored. An example is the idea put forward by the Rand Corporation that a lead screen could be hoisted into outer space, and hung on a balloon in front of an outer space test and so shut off the tell-tale gamma rays which would otherwise disclose the test to monitors on earth! This is the kind of Buck Rogers business which crops up in the speeches of Senators like Dodd. Fortunately there was an independent minded scientist from Los Alamos, Dr. Herman Hoerlin at the hearings on March 8, whose plain speaking annoyed the military. Dr. Hoerlin said he had been out in the field during the Johnston Island area for four or five months and was well acquainted with the difficulties even for "a straightforward test series" in near space. "Now," he told the Joint Committee, "when it comes to the point to launch a vehicle with a weapon, to launch also instrumentation that brings diagnostic information back, and if one wants to display in addition the equivalent of a lead balloon, one really gets into a very complicated pattern." Dr. Hoerlin said the effort involved in such a test would be "quite tremendous." Dr. Hoerlin testified (see box on page 7) that efforts at secret testing in outer space would be "extremely difficult" and "a waste of scientific manpower." But how few people will ever know of his testimony and how much weight would it have anyway with those whose first premise is that the Russians are superhuman and super-diabolic, and want a test ban agreement only to cheat on it? How combat irrational views with rational argument?

The Joint Committee operates like a rubber stamp Parliament with no opposition. At point after point one missed the absence of at least one member with the energy and independence to subject witnesses to sharp inquiry from a standpoint friendly to a test ban. No one asked, for example, about the failure of any witness in four days of testimony to discuss the ease with which on February 2, 1962, the AEC immediately detected, identified and located the first (and so far as we know only) Russian underground test at their Central Asian proving grounds in Semipalatinsk. Of the hundred or more stations around the world now cooperating with us, how many detected this shot? How many identified it as nuclear? How many located it in the Central Asian Russian proving grounds? What were the various estimates of its size? Why was none of this information offered or demanded?

No questions were asked and no information offered about the "unannounced" i.e. secret tests in our own testing program. These provided an authoritative way to determine the efficiency of our policing apparatus. The whole series was monitored by a network of Coast and Geodetic seismic stations. How many of the "unannounced" tests were detected by this network, how many identified and located? One may be sure that if the results were poor, the Air Force or other official opponents of a test ban would have leaked them to the press long ago. Secretary of State Rusk admitted at a hearing chaired by Senator Humphrey March 11 that our capacity for detecting violations of a nuclear test ban are "better than can be fully disclosed."

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On Site Inspection by Congressmen!

"Whereas the security of the US and the strength of free world alliances are directly affected in any consideration of arms control and/or disarmament; and

"Whereas the 18-Nation Committee on Disarmament, meeting in Geneva, is considering steps toward general and complete disarmament;

"Resolved by the Senate (the House of Representatives concurring), That it is the sense of the Congress that the American negotiating positions in arms control disarmament include these safeguards:

"(1) Complete on-the-spot inspection of all areas involved in arms control or disarmament agreements with Members of Congress included as members of the inspection team. . . ."

—Senate Concurrent Resolution 21, by Curtis (for himself), Beall, Bennett, Dominick, Fong, Goldwater, Hruska, Jordan of Idaho, Lausche, McClellan, Mechem, Metcalf, Mundt, Randolph, Robertson, Scott, Simpson, Thurmond, Tower and Young of North Dakota.

Holifield Tries to Overawe A Scientist Who Doubts Importance of Small Tests

Rep. Chet HOLIFIELD (D. Cal): You are eliminating, in effect, any concern as to the improvements of weapons which could obtain under a 2 or 3 kiloton test in alluvium.

Dr. Frank PRESS [Pres. Seismological Society of America, Caltech]: That is right. Now, speaking as a private citizen and not an expert I would say that when I think of the possibilities that he has for weapons development under the circumstances, I do not think it is a risk to our security.

Rep. HOLIFIELD: May I ask you, have you been thoroughly briefed in the degree to which advancements can be made with an average of 3 kiloton power of test explosions or less?

Dr. PRESS: I have had discussions with people who know.

Rep. HOLIFIELD: With weapons development people?

Dr. PRESS: With weapons development people. But I would like to add that I am not an expert in this field. However, I have framed an opinion on the basis of the discussions that I have had.

Chairman PASTORE (D. R.I.): You mean you have based an opinion as to what weapons development might take place?

Dr. PRESS: As to the threat to our security by a weapons development program which has to be undertaken in deep cavities, in large cavities, or in small yields under alluvium coupling.

Rep. HOLIFIELD: And you are aware of the improvements that have been made in the Nevada test series with that level of testing?

Dr. PRESS: Not as a specialist, but as a listener in discussions that have taken place.

Rep. HOLIFIELD: Unclassified discussions, or classified?

Dr. PRESS: Some of these were classified.

—Joint Congr. Atomic Energy Committee, March 7.

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Humphrey's Disregarded Senate Speech Challenging Enemies of Test Ban

We present here the heart of the great speech made by Senator Hubert Humphrey in the Senate March 7 for a nuclear test ban treay. That speech received scanty coverage in the press though it included some rather sensational revelations, as may be seen from the boxes at the bottom of pages three and four. We recommend a reading of the full discussion in that day's Congressional Record to all thoughtful students of the subject. Hubert Humphrey again showed his capacity to come through in a big way on a fundamental issue.

First, it is argued that the United States should not enter into a test ban agreement because we should develop the neutron bomb, a bomb which is free from fission products.

Now what is the answer to this claim: the main interest of the United States in the neutron bomb is in preventing the Soviet Union and other countries from developing it. That is our first interest. The test ban agreement would prevent the development of such a weapon. The neutron bomb, if it can be developed, would be more useful to countries which did not already have a heavy stockpile of high cost nuclear weapons, because the neutron bomb would be cheaper. The Soviets and other countries are more likely to obtain a neutron bomb with continued testing than under an agreement, because with no inhibition on testing nuclear weapons, nuclear technology is more likely to spread. But the United States has such a large stockpile now of various kinds of nuclear bombs and nuclear warheads that there is no great military need for this weapon. And in terms of obtaining a pure neutron bomb, this is considered extremely difficult, next to impossible, to develop.

We Don't Need A Neutron Bomb

If one is talking about a bomb with fewer fission products involved, the U.S. already has made substantial advances in this field. We do not need to test and develop a neutron bomb. It would be to the advantage of the Soviet Union, which has fewer resources than we have and fewer quantities of fissionable material than we have, to develop a neutron bomb.

Second, it is argued we need to continue to test in order to perfect an anti-missile missile.

The answer: This is not correct. The performance of the anti-missile missile does not rest primarily on nuclear weapons tests. It rests primarily on other kinds of activities such as reliability of guidance, distance, performance, electronics. In addition, the nation sending a missile to its target has the advantage over the nation trying to erect a defense against such a missile. The efforts to build anti-missile missiles and then to build better missiles to counteract anti-missile missiles is a sure way to add another $20 to $25 billion to the nation's armament effort, which we will do in the absence of any agreements to curtail such weapons. I for one would rather see effective agreements to stop this spiralling arms race than to see both the US and the USSR exhaust their economies in such efforts, which will give neither an absolute military advantage.

Third. It is argued that the Soviet Union has already perfected the anti-missile missile by test. There has been no demonstration of such a capability. We have no such information. Furthermore, an anti-missile missile knocking down an incoming missile launched under ideal conditions for being intercepted is not proof of an anti-missile missile

Our Lopsided Press on the Test Ban

"Not too many months ago President Eisenhower warned this country about the power of the military-industrial complex in our economy and in our political life. I think that warning was well justified. I share the concern of my friend [Senator Humphrey] that the industrial-military complex in this country is such an effective agent for promoting expenditures in the defense system, in the interest, really, of keeping the arms race going, that they blanket the press with propaganda that they want to give to the American public, in the interest of why we are for tests. The other position is not given to the American public, and we are led to believe by columnist after columnist, by scientists, even by Senators, that those who seek a test ban treaty seek something that is dangerous to our security, and that no patriotic American would dare stand up for an agreement which the Senator from Minnesota and I know would be a sensible agreement for the President to propose to this body."

—Clark (D. Pa.) in the Senate, March 7.

Humphrey Complains That A Leak Undercut U.S. Bargaining Power at Geneva

"It is not very easy to be a negotiator for the U.S. when the U.S. negotiating position appears on the front pages of the newspapers 24 hours before he even has official notice of the Government's position.

"It seems to me that somebody in this Government had better find out why there are so many leaks of highly confidential, highly sensitive information which is essential to the conduct of our negotiations with foreign powers.

"When I attended the conference at Geneva, I knew the position of the Government and I knew what modification had taken place. I had to stand before delegate after delegate and deny that I had any special information, because our Government was not ready to present it at the negotiating table. Nevertheless, newspapers in the U.S. published the U.S. position 24 hours before a single American delegate was permitted to acknowledge he had the information.

"I talked with the Italian Ambassador, the Ambassador from Sweden, the Ambassador from Brazil, the Ambassador from Canada and the Ambassador from the United Kingdom. Everyone of these Ambassadors asked me, 'Senator, we hear that your Government is now going to offer seven on-site inspections instead of 8 to 10. Is this true?' I happened to know that it was true at that hour, but my Government had not permitted me to say it was true, because we were not yet ready to expose our position at the conference table. WE WANTED TO GET SOMETHING IN RETURN BEFORE REVEALING OUR HAND. [Emphasis added.] But the story appeared the day before in the Washington Star, in the Paris edition of the New York Herald-Tribune, and in the European edition of the New York Times.

"If anyone at the White House, or the FBI, or anywhere else, should read these remarks, I hope he will seek out the professional leakers instead of chasing down every alleged leftist under every sagebrush."

—Humphrey (D. Minn.) in the Senate, March 7.

The leak to which the Senator referred first appeared in the Washington Star, often a vehicle for Air Force leaks. The effect was to stir protest in anti-test ban circles against a new 'give-away' at the expense of weakening the Government's bargaining position at Geneva.

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Idea That Cheating Could Change Balance of Power Called Poppycock

capability under wartime, surprise attack conditions.

Fourth. It is argued that we need to continue to test to develop bigger weapons in order to overcome such obstacles as anti-missile missiles or missiles hardened in the ground. It is argued that we need to test to develop more tactical nuclear weapons to use in limited war situations. It is argued we need to test to reduce the weight of a given yield of nuclear warheads of specific missiles. My answer to such assertions is that as long as there is an arms race, the U.S. must stay in it and build a military force strong enough to deter the Soviets from starting a nuclear or conventional war. But our objective is to limit the Soviets and to slow them down, not merely to keep adding to our stockpiles. It is our stated goal as a nation and as a people to end this mad arms race under adequate safeguards.

On The Danger of Cheating

Fifth. It is argued that if the Soviets cheat on an agreement to stop testing they can force the U.S. into surrendering completely to the Communists. That is poppycock. In the first place it would be difficult for the Russians to conduct even one clandestine test without considerable risk. In the second place, it would be extremely difficult to cheat on a series of tests, which is what any violator would want to do to attempt to gain a military advantage. In the third place, our Defense Department believes that no amount of cheating under the kind of verification system being proposed by the U.S., could alter the strategic military balance.

Sixth. It is argued that the verification system proposed by the U.S. is less effective than that proposed previously. In many ways the verification system is more effective, given the advances made in the art and science of identification of weapons and tests and events which might be confused with weapons tests. The verification system would come into effect sooner than the one previously proposed. The system would be operated or supervised by U.S.-U.K. nationals and, therefore, would not have to await the training of a new corps of technicians. The system detects underground events in the Soviet Union and identifies them better than was estimated in any previous control system proposed.

Seventh. It is argued that the verification system is weaker because it does not include stations on Soviet territory. The U.S. no longer needs internationally manned detection stations on Soviet territory, because our ability to detect and identify makes this unnecessary. However, both the US and the U.S.S.R. have proposed as a supplement to the basic verification system that automatic recording stations for increased detection and identification of underground events be installed on each other's territory. The sealed instruments and records of these would be picked up and serviced, respectively, by personnel who are not nationals of the territory on

The Real Risk to National Security

"We have heard primarily of the difficulties involved in a ban on further testing. Almost all of the criticism has been levelled at the possibility of cheating. The other alternative or risk has seldom been mentioned, namely, the risk of unrestricted nuclear testing, which would give the Soviet Union nuclear parity with the U.S. and alter the balance of power.

"As of this date, the balance of power is in our favor. The balance of power 5 years ago was even more in our favor. Ten years ago it was unmistakably in our favor. Had we been able to obtain a test ban treaty 6 years ago, the Soviet Union today would be, for all practical purposes, a second-rate power."

—Sen. Humphrey (D. Minn.), in the Senate, March 7.

Humphrey Charges Truth About Our Test Detection Ability Being Withheld

"Today I have in my office, for my personal use, document after document which is labelled 'secret.' I am told, 'Do not use it; just look at it.' But when I want to engage in debate with those who hold a different point of view on the issue of nuclear tests, and when I need the evidence —such as evidence on the VELA project or data on research by the Dept. of Defense and particularly by the Air Force— I am told, 'You cannot do that; it is secret.' Mr. President I do not know how one can possibly come to an understanding regarding this issue if all the evidence is labelled 'secret.' Mr. President, the people of the United States are getting sick and tired of this so-called secrecy. . . .

"When my colleagues read the secret reports and read what the Senator from Minnesota [Mr. Humphrey] has said, they should also read the material [i.e. secret material available to Senators—IFS] from which I drew this conclusion. I wish especially to bring to my colleague's attention what I have just stated so I repeat the sentence: 'Moreover, the U.S. system is capable of detecting some seismic events below the presumed 'threshold', so that no nation could be sure that its clandestine tests would go undetected.'

"That is a masterpiece of understatement. The fact is that our detection capability is much greater than the press has led us to believe on the basis of the information it has received from the U.S. Government. . . .

"This question of the identification of underground events has become of such interest to my colleagues and others that I have requested the administration to make available to the public the 5-year study of the detection and identification of underground events in the Soviet Union. This covers the period from 1958 through 1962 and it shows precisely how many events were detected, and the ways in which they can be judged to be identified in varying degrees, and the geographical areas in which they occur. This study shows clearly why the number of inspections and the number of detection stations can be reduced without in any way diminishing the effectiveness of verification. . . .

"When the Air Force wanted to prove that Skybolt was what was needed to supplement our defense posture, newspaper stories were spread all over the United States saying what a marvellous weapon it was, even though later the President had to tell the American people it was 'off target,' that it was not all the Air Force said it was. But the Air Force wanted to publicize it, and they used it to shoot the President out of his negotiating chair at Nassau.

"But when it comes to the issue of advances in seismology, we are handcuffed. I will abide by the law but I do not like it. I have said to the President and to those responsible for our position on nuclear tests that the American people need to know the facts. Tell the American people of our detection system. Tell them what we have. We are always telling them what a big bomb we have. Tell them what a good detection system we have. I do not say it is foolproof or perfect. I merely say the results in 3 years of research are phenomenal, and I challenge anyone to prove the contrary."

—Humphrey (D. Minn.) in the Senate, March 7.

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Soviets Would Have No Veto Over Conduct of On-Site Inspections

which the stations were located. The US has proposed 7 such stations; the USSR has proposed 3.

Eighth. It is argued that the number of inspections being proposed by the US is not adequate. The number of inspections is adequate when one compares the number with the total number of events in the Soviet Union that would be highly suspicious. At one time the US proposed to have 12 to 20 inspections when it thought there might be as many as 70 to 100 unidentified underground events equal to a 19-kiloton explosion. At the same time we proposed not to inspect for 3 years any event which was below this period. We were proposing to inspect roughly 1 out of 5 unidentified events above the equivalent of 19 kilotons.

Today we are proposing that all unidentified events be subject to inspection—no more moratorium; no threshold—even though we presumably are not worried about small tests any more than we were then. We simply think this provides greater deterrence to a cheater. As to large seismic events, the number of those that are really most suspicious, that is, that give no indication of being an earthquake, number only about a dozen, as compared with the previous estimate of from 70 to 100. We can easily maintain the same ratio of inspections to number of events and have some inspections left over for the smaller events.

U.S. Position Stronger

It has been stated that the US position now gives the Soviet Union a veto on a control body for a test ban treaty. The Soviet Union would have no veto over the conduct of an inspection. The US would pay for its own detection stations, and it would pay for its own participation in on-site inspections. We would not rely on a tripartite arrangement. Therefore, any control commission would not have authority over this expenditure. In this sense, the US test ban position gives a greater degree of flexibility to the US than under previous positions.

I know about this because it is one point about which the Soviet delegates became very angry when it was presented to them. When we reduced our required number of inspections from 8 to 7, we also tightened up on the method of inspection, the question of the composition of the inspection team, of access to the site of the inspection, of the duration of the inspection, and, finally, of the analysis of the data yielded by the inspection.

Mr. President, I am not discussing a theoretical subject. For hours I sat across the table from one of the most able and determined men I have ever met, the Deputy Foreign Minister of the Soviet Union, Mr. Kuznetzov. When we reminded him—because we wanted to retain a negotiating positon—that we wanted to preserve an area of agreement, he reminded us that we were toughening our positions and were making it more difficult. He was a good deal more correct than were some of our critics in the United States.

It is claimed that the test ban policies pursued by the Eisenhower and the Kennedy Administrations have cost the US a lead in nuclear weaponry. Actually it would have been more in the US interest if a nuclear test ban treaty could have been achieved in 1958 and 1959. The arms race, including nuclear testing, is buying the US less security than we would have with effective arms control and disarmament agreements.

—Humphrey (D. Minn.) in the Senate, March 7.

Hosmer's Arithmetic of Nationality

Rep. Craig HOSMER (R. Cal): If you have 14 experts and 7 were from the U.S. and U.K., two Canadians, two Swiss, two Czechs, two Poles, do you have any opinion of how effective that team might be able to do its job?

Dr. J. P. RUINA (Dir. ARPA): I would say that team is less effective than 14 who are US, UK and Canada alone.

Rep. HOSMER: Do you have an estimate of by what magnitude less?

Chairman PASTORE: I hope we are not trying to be funny. I hope that the witness will not lose his patience. He has been very nice up to now. I realize he has been here all day. I hope the Congressman will keep this witness within his own competence.

Rep. HOSMER: I think I have every right—

Chairman PASTORE: The question is ridiculous, Mr. Congressman. By what factor will it make any difference if you have two Swiss as against two Italians. What are we getting into here?

Rep. HOSMER: We will substitute the Italians for the Swiss. Would your answer be the same?

Dr. RUINA: I have no competence to answer the question. I have never worked in a team with Swiss or Italians.

—Joint Cong. Com. on Atomic Energy, March 5.

Hosmer Doesn't Want Any Optimistic Statements Cluttering Up The Record

Dr. J. P. RUINA [Director, Advanced Research Projects Agency Dept of Defense, in charge of research designed to increase nuclear test detection capability in outer space and underground]: You cannot assign a probability number to the effectiveness of a single inspection, any more than you can assign a probability number to that of the solution to a single crime. But the fact is that "perfect" crimes are planned and executed but nevertheless often leave cluse. Criminals do get caught, particularly if they must commit a long series of crimes to achieve their objectives.

My own general conclusion, though, is that a cheater would have a difficult time persuading himself that he could risk thorough inspection of a site at which a clandestine test had actually taken place, particularly so if the treaty closely safeguarded the rights of the inspecting team of experts to reasonable size and to reasonable use of specialized equipment and techniques that are being developed for this purpose.

Rep. Craig HOSMER (R. Cal): Mr. Chairman, I would like stricken from the record the witness' last statement, in as much as he has no competency to express such an opinion which he acknowledges to be an opinion.

Chairman John O. PASTORE (D. R.I.): He stated it as an opinion. I think the record ought to stand and people can pass their own judgment on the competency. I think the witness has a right to make the statement.

Rep. HOSMER: We are to hear witnesses in the area of their expertise. This witness is stating an opinion in an area in which he is not an expert and therefore it clutters the record.

Chairman PASTORE: If the Congressman thinks so, he has a perfect right to think so. I think the record ought to stand.

—Joint Congr. Atomic Energy Committee, March 5.

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No Hurry About These Tests

Another area the Committee failed to explore has to do with the delay in carrying out nuclear tests for the purpose of improving detection methods. At the Committee's hearings in July 1961, three months before the Russians broke the moratorium on testing, Defense Department witnesses stressed the need for resumption in order to improve means of detection. A program for this purpose was outlined to the Committee and it was told "there is a strong possibility that these tests will provide an indication of some new way of identifying an underground nuclear explosion which may have been overlooked in the course of theoretical analysis." But once testing was resumed the Defense Department managed to restrain its enthusiasm for *that* kind of testing. The program outlined to the Committee in July, 1961, was sidetracked. Eighteen months later, in January of this year, the Atomic Energy Committee in its report for 1962 noted briefly that "no nuclear detonations have been authorized to date solely for the VELA UNIFORM research program," i.e. the program to improve means of detection. Major General A. W. Betts, USA, director of the AEC's division of Military Applications told the Committee on March 7, "At the time underground weapons testing was resumed, it was necessary to redirect our resources and efforts in full support of the weapons test program." The VELA UNIFORM experiments were limited to those which could be held "in conjunction with the underground weapon tests." Nobody, of course, asked Gen. Betts why tests to improve means of detection were considered of less importance than weapons improvement nor why the program outlined in July, 1961, has been reduced so sharply. The present program calls for one 10 kt shot at a depth of 1200 feet in granite (Project Shoal) to be fired some time next Fall. Strictly speaking this is the only shot being prepared to study problems of improving detection. The rest of the nuclear test program (Project Dribble, a lovely name for it) consists of three shots to be set off in two Mississippi salt domes to study means of *hiding* a nuclear explosion, in accordance with the Teller-Latter "big hole" theory.

This "big hole" theory may be dubious as science but remains useful as a public relations gimmick to stir mistrust of a nuclear test ban agreement. Four years ago Dr. Edward Teller and his assistant, Richard Latter, unveiled it as a method for hiding tests in excavations. It was said that this would make it possible to disguise a 300 kiloton shot to look like one kiloton. Although a vital part of their computation was the assertion that hard rock or salt would muffle an explosion by two and a half times, and it has since turned out that instead it magnifies the shock by two or three times, two experts from Teller's Livermore Laboratory assured the Committee that the "big hole" theory was good-as-new. Only now they said it would reduce the apparent size of a hidden shot by 190 instead of 300. This was based on extrapolation from a 1,000 pound or half ton chemical explosion. This is a long way from the 300 kiloton, or 300,000 ton, nuclear explosion with which the Teller-Latter theory made its debut. The real problem is whether the enormous cavity required by the theory can, as a matter of practical mining engineering, be constructed. Several hints of the difficulty appeared in the testimony but the Committee failed to pick them up. At one point on March 6, Dr. Charles C. Bates, chief of the Vela Uniform branch, which has to do with underground testing, burst out with the statement, "Dr. Latter is not a mining engineer, and he also postulated a cavity size that will not stand

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Really Devilish Play

Sen. Wallace F. BENNETT (R. Utah): Can they bait us or trap us into using our seven inspections on incidents that obviously are not, or rather incidents on which we will find no evidence of violation so that for the rest of the year they are pretty well free to violate? . . . Supposer our seven were gone by the first of June, and then our seismologists turned up a series of very, very suspicious events and we no longer had an opportunity to go in? Would we have the right to abrogate the treaty or would we be bound?

Dr. Franklin A. LONG (Assistant Director for Science and Technology, Arms Control and Disarmament Agency): We always have the right to abrogate the treaty.

—Joint Congr. Atomic Energy Com., March 8.

Somehow Whatever Might Help Toward Disarmament Gets Labelled Secret

"Let me point out that when the so-called Berkner report was prepared—and, by the way, it was conveniently 'leaked' to many sources—I received a copy. I had it locked in the safe in my office. Members of the Disarmament Subcommittee had seen it, but I could not release it. When I wanted to speak on the subject in the Senate, all the material I needed was marked 'secret.' Finally, I served notice that, if need be, I would ask that the galleries be cleared, the doors to the Senate Chamber be closed, and the Sergeant at Arms guard the doors, and then I would disclose the report to the Senate under these extraordinary circumstances. The Berkner report provided considerable information which was needed in order to improve seismology.

"As a result of that difficult and hard-fought battle, we were able to put millions of dollars into advance research programs for the improvement of seismographic instrumentation. It was planned to spend over some 5 years approximately $200 million to improve seismology. But unless some of us had stirred up a fuss, at that time, the Berkner report would have stayed in the archives, gathering dust. . . .

"Frankly many members of this body feel strongly in opposition to our test ban policy. Possibly they have not read the secret material. Perhaps they have access to some secret material I do not have. There is so much secret material, particularly in the Joint Committee on Atomic Energy, that it is pretty hard for an ordinary Senator to get in there. That is the trouble with secrecy. We get so secret that we do not dare to talk among ourselves or think for ourselves. But I have read a good many secret documents and I am going to read some more in my capacity as a U.S. Senator. I am a member of this Government. I have all the clearance anyone can possibly have. I intend to be able to discuss the relevant portions of this 'classified' information, at least in terms of their general conclusions.

"For months I have wanted to release a document showing that the industrial leaders of our country favor disarmament; that the industrial leaders of 365 of the largest corporations of this country have demonstrated that we could enter into a disarmament agreement without any serious domestic economic impact. The report cannot be released. It is labelled 'Confidential.' The Senate Committee on Foreign Relations will not release it."

—Humphrey (D. Minn.) in the Senate, March 7.

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up if he tries it," but a series of angry questions from Hosmer shut him up. General Betts said in his prepared statement that the first nuclear short in a "big hole" could not be held until early 1964 and that the precise date was "questionable due to the complexity of the cavity construction."

Huge Cavity for So Small A Shot

No one on the Committee pointed out that this shot will only be 100 *tons*, not kilotons. Yet even for so small a shot, one-tenth of a kiloton, a cavity of 95 foot diameter and two 2,000 foot shafts will be required. A cavity of 95 ft. diameter is as tall as a 9-story building. A Bureau of Mines official whom I reached during the hearings estimated that the two shafts and the cavity would require the excavation of some 40,000 tons of salt. If eight ton trucks are used, this means 5,000 truckloads. Nobody asked how so extensive an excavation and removal job could be done without attracting the attention of intelligence.

The most striking example of the Committee's failure to ask the obvious question was in regard to alluvium. Alluvium is now the favored medium of the anti-test ban forces. In the recent test series we discovered that tests in alluvium were muffled. The Air Force expert Carl Romney told the Committee we could now, from outside the Soviet Union, detect explosions at 2,000 miles or more "of about 1 kiloton in granite, 2-6 kilotons in tuff, and 10-20 kilotons in alluvium." Alluvium is a soft soil, defined by the dictionary as "soil, sand, gravel or similar detrital material deposited by running water and especially during recent geologic time." Members of the Committee seized on this to assume that the Russians would therefore do their testing in alluvium. There were even estimates that by using alluvium they could hide tests of up to 70 kilotons. If the experts had wanted or been allowed to speak plainly it would have been seen that this was nonsense. Buried here and there in mountains of unnecessary and confusing detail—a favorite way of hiding the truth—were occasional admissions which escaped notice. One witness said alluvium deep enough for use in nuclear tests was only to be found in a few desert areas; even Dr. Romney admitted in passing that "most shots in alluvium were followed by the formation of surface collapse craters" which would reveal that an explosion had taken place; another witness said alluvium could not be used for explosions larger than 15 kilotons, it was too soft to contain larger blasts; the witness who testified on "big hole" theory tried to explain to Chet Holifield that you simply couldn't build a "big hole" in alluvium; another disclosed that a station more than 2,000 miles away in Northern Canada had with ordinary seismic equipment detected a 2 kiloton shot in alluvium during our recent test series. But these were not

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On The Buck Rogers Nonsense About Hiding Tests in Space

Rep. Jack WESTLAND (R. Wash): Doctor, I think if I was going to cheat and conduct a nuclear test, I would not put it in space with the testimony you fellows have given here.

Chairman PASTORE (D. R.I.): In other words, is it fair for us to assume that if any nation, being party to an agreement not to shoot in space, dared to do so clandestinely that the time and the trouble and the impossibility of the task would be such that it would be better for them to abrogate the agreement?

Dr. Herman HOERLIN (Los Alamos, who had just been testifying on the problem): Testing in space in a clandestine manner is extremely difficult and in a way would be a waster of scientific manpower.

—Joint Com. on Atomic Energy, March 8.

Soviet Experts Proven Right: Did Our Experts Exaggerate to Block A Test Ban?

"In addition to improving our ability to identify earthquakes in the Soviet Union, the U.S. has found that the number of earthquakes in the Soviet Union of a certain magnitude is much lower than was originally supposed. In fact, it is at least 2½ times lower than we had earlier calculated. When the question came up at Geneva, the Soviet representatives tried to tell the U.S. that we were exaggerating the number of earthquakes that took place in the USSR but we refused to believe them."

—Humphrey (D. Minn.) in the Senate, March 7.

What the Soviet Experts Said

"Thus, on the basis of a more careful analysis of the new seismic data, the Soviet experts have come to the conclusion that the annual number of earthquakes throughout the world equivalent to explosions of given yield are, if anything, smaller than the numbers estimated at Geneva in 1958 and not 1.5 or 2 times greater as is asserted in the U.S. documents."

—Statement by the Soviet experts at Geneva, Dec. 18, 1959, appended to Technical Working Group 2 Report. (The easiest place to find this document is at page 605 of the Joint Atomic Energy Committee's 1960 hearings on test detection.)

What Our Experts Now Admit

"We have learned that the number of earthquakes which produce seismic waves of the same size as an explosion of given yield and in a given medium are less by a factor of 2 or 3 times than had been estimated previously."

—Dr. J. P. Ruina, director of ARPA, the Pentagon agency for improving test detection, opening the Joint Committee's new hearings on the subject, March 5, 1963.

All The Errors in the Same Direction

"Having uncovered many errors as mentioned above, and even some misrepresentation in U.S. statements, the Soviet experts note that they all tend in single direction—towards reducing the estimates of the control system's effectiveness [i.e. the system agreed on by the experts a year earlier in 1958 to police a test ban]. The Soviet experts therefore cannot regard these shortcomings as resulting from carelessness or coincidence, and have come to the conclusion that there has been tendentious use of one-sidedly developed material for the purpose of undermining confidence in the control system."

—Statement by the Soviet experts, Dec. 18, 1959.

Air Force Was Most Wrong

These new "findings" were used at the time by the U.S. delegation to upset the 1958 agreement. It is worth noting that in the paper on "Earthquakes in the USSR" presented by Dr. Carl F. Romney, the Air Force expert at the new hearing March 5, it is disclosed that while the Rand Corporation overestimated the number of Soviet earthquakes by 2.5 times, Dr. Romney's agency (AFTAC) overestimated by 4 times, i.e. it made the problem of distinguishing explosions from earthquakes look in this respect four times more difficult than it has turned out to be. The Air Force is the foremost opponent of a test ban.—IFS.

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brought together, as they are here, and I predict that references to alluvium will form a deep geologic strata on the floor of the Senate during the coming debate on a test ban.

Little Alluvium in The USSR

But the most obvious limitation was never mentioned in any of the prepared statements nor elicited by the most natural question of all, which no one asked—and that was: how many areas in the Soviet Union have alluvium which could be used for testing? When I inquired outside the hearing room, I learned that a map prepared by the Military Geology branch of the U.S. Geological Service last October showed there were only two small areas in the Soviet Union with alluvium at depths sufficient for nuclear explosions. One is directly on the Iranian and Afghan borders, the other is between Tashkent and the Aral Sea about 400 miles from Iran. At those distances we could detect shots at a fraction of a kiloton. Along the Iranian border we also have many acoustic, electronic and visual devices to learn what is going on. Yet it was not until the closing hours of the hearings on Friday, March 8, that Dr. Franklin Long of the Arms Control and Disarmament Agency showed this map to the Committee and by then most of the Committee and the press had left. The significance of this was never driven home.

All the Committee wanted was to elicit the fact that one couldn't be absolutely certain of detecting all tests, even any series of tests. If seismic equipment were made infinitely sensitive, we would register the fact that the earth is constantly quivering like a jelly. If only nuclear explosions were made small enough, at some "fire-cracker" level they could theoretically be hidden among these minute earthquakes. The Committee was not interested in approaching the subject from the other angle. If a violator wanted to cheat, how could he be sure of escaping detection? The answer is that he couldn't. Even in the veiled official presentations, one could see that a violator could never be sure that some unexpected freak—like the Canadian station which detected 2 kilotons in alluvium at more than 2,000 miles—might not trap him. The use of seismometers in array and in deep holes is turning out to be a way of raising detection capacity by as much as tenfold. The two non-official witnesses, Dr. Jack Oliver, the Columbia geologist, and Dr. Frank Press, of Caltech, currently President of the Seismological Society of America, were optimistic. The former showed how easily most of the earthquake areas of the Soviet Union could be monitored by seismic stations buried in the Pacific ocean bottom offshore. Dr. Press said that a combination of diagnostic aids would make it much easier to distinguish quakes from explosions. But this optimism, like Dr. Ruina's hopeful conclusions, got no welcome from the Committee (see boxes on pages two and five). The Committee's prime interest was in digging up material to cast doubt on a test ban, not to prove its feasibility. The Committee wasn't interested in figures to prove it improbable that old women could fly on broomsticks. It prefers Rand Corporation studies showing that if miniaturized jet engines were put in the rear end of the broom and operated by transistor, then. . . .

And What If They Test On The Back Side of the Moon?

Rep. Jack WESTLAND (R. Wash): You mentioned one thing about a test behind the moon. I believe you said you could detect it with proper equipment.

Cdr. Donald E. CHANDLER (USN), [Chief VELA SIERRA, the project concerned with detecting outer space tests]. The resonance scatter techniques affords a reasonable means for detecting such tests.

Rep. WESTLAND: Do you think the Soviet could get any information out of a test that was conducted on the other side of the moon?

Cdr. CHANDLER: We are getting into a realm that is somewhat again outside of my particular area of speculation.

Rep. WESTLAND: If you could not get any information out, do you think they could?

Cdr. CHANDLER: There is always an advantage when you know where and when to make your measurements. If you are conducting a test, you have a considerable advantage. For instance, the Russian shot where they orbited a small space vehicle behind the moon—I am sort of stepping out of my field completely —this could have been done with two small vehicles, one behind the other, one conducting the test and the other making the measurements.

Rep. WESTLAND: And one came out from behind the moon and told them what went on.

—Joint Congr. Atomic Energy Com., March 8.

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